SOC 250: Introduction to Geographic Information Systems

Instructor: Dr. Robin Lovell
Office Hours: Mon/Wed/Thur | 12:00pm-1:00pm | Google Meet: click here
Email: robin.lovell@manhattan.edu
Website: www.robinjlovell.com
Lecture/Lab: Mon/Thurs | 1:35pm-2:50pm | Zoom ID: see Moodle

Introduction

Course Description: Social scientists from all disciplines often gather and analyze data that is tied to a geographic location. This course introduces the concepts and components of geospatial thinking through a geographic information system (GIS), using ESRI's ArcGIS software package. Course topics include spatial data acquisition, projection systems, geodatabase design, spatial query and display, spatial analysis and modeling, and cartographic design. Students will also be exposed to basic concepts in remote sensing and Global Positioning System (GPS). GIS technology has broad applications in natural and social sciences, humanities, environmental studies, engineering, and management. Examples include planning, social service distribution, criminology, agriculture and forestry, environmental quality assessment, emergency management, consumer and competitor analysis, and many more. Students will work through case studies in their accompanying lab work, building skills in ArcGIS. This course is a laboratory-driven course designed to dramatically increase your ability to understand and work with geospatial data.

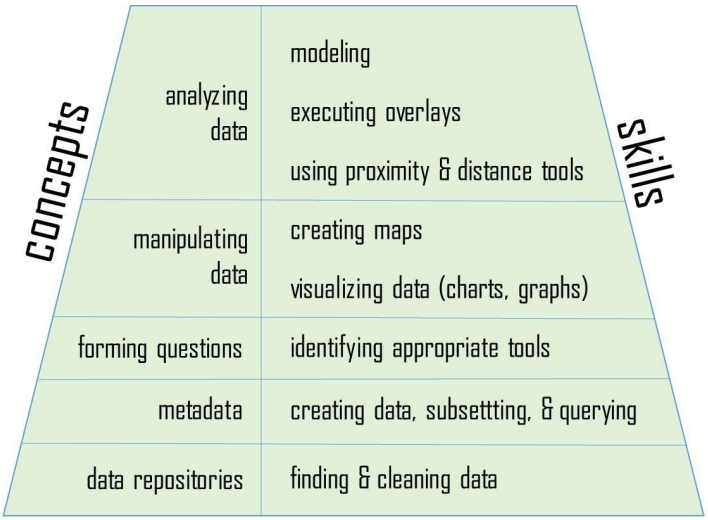
Learning Objectives: At the end of this course, you will build most skills in the figure below. You will be able to:

1. Articulate quantitative (practical) and qualitative (philosophical) research questions
2. Find, clean, and create spatial data and metadata
3. Analyze spatial data using geographic information system (GIS) software tools (ArcMap and ArcGIS Pro)
4. Create maps and other visualizations to meaningfully communicate spatial data

Evaluation

Your course grade will be assigned according to the following percentages:

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	64-66
F	Below 64



Each assignment is graded on a 100-point scale, and then become part of the following major categories for your overall course grade.

- Live Session Attendance (½ showing up, ½ popcorn) 15%
- Online Activities (discussion & assignments) 10%
- Labs (7 total, worst grade dropped) 20%
- Project Story Map (20%) and Presentation (10%) 30%
- Midterm (10%) & Final (15%) 25%

Live Session Attendance: There are 15 live, synchronous, online sessions I expect you to attend. *Please do not email me or ask me for individual class session attendance waivers or makeups for the In-class Exercises.* You have two (2) excused absences for the semester. DO NOT email me about being absent (please?). More than two absences *will result in a reduction of 5% in your overall grade for each absence*. In accordance with Department of Sociology policy, missing *more than six (6) class sessions will result in a grade of "F" for the course*. DO NOT come late (see the Course Schedule below for live session **dates in bold**). What is "popcorn?" It's like playing tag as you answer a question. You call on the next person once you are done talking.

Online Activities: They're like attendance, but not. There are online activities I expect you to complete which take the place of live, synchronous, online sessions. They vary, including the midterm and turning in assignments, but mostly involve watching videos and completing a "thinking" or "doing" task (see Moodle for details and due dates).

Labs: You must complete **seven** (7) lab exercises, each intended to integrate theory from lecture with practical, hands-on experience applying the concepts using GIS and related spatial software. *Dr. Lovell will automatically drop the lowest lab grade* (see Moodle for details and due dates).

Project**:** The final project is based on the quality of your spatial analysis and a series of assignments that will account for a portion of your Project grade (see Moodle for details and due dates).

Midterm & Final**:** I will provide a study guide at the beginning of the semester. You will be able to fill out the study guide using PowerPoint slides, readings, videos, lab instructions, by attending class and participating in discussions.

Course Expectations

Laptops**:** To participate in this course you must have access to the McHenry Library room 506, the McHenry basement computers, or a laptop that can handle ArcGIS Online, ArcMap 10.6, and ArcGIS Pro. For recommendations, click here and here. If you do not have access to these spaces, and need a laptop for the semester, contact Dr. Lovell as soon as possible.

Thumb Drives: If you are using a communal computer that is not your own, you will need to purchase a thumb drive to save your lab work between sessions. The Manhattan College-provided thumb drive should work. Please contact me if you do not have a thumb drive, if you are unsure of what to purchase, or if you need financial assistance.

Late Work and Grade Changes**:** I do not accept late assignments. Please anticipate Moodle and other common problems and allow time for them. I also do not change grades unless I have made a mistake in assessing you, per a rubric or clear factual error. These policies exist for two reasons. First, I value organization, tenacity, and a strong work ethic. I believe the method of evaluation in this class is fair and that by reading this syllabus and remaining in my class, you agree. Second, only those with privilege (meaning gender, class, or race) tend to believe they deserve to turn in late work or receive a better grade despite the clear expectations outlined in this syllabus. I do not believe in rewarding privilege in itself.

Cell Phones: No cell phones are allowed in class. Please turn your ringers on silent and leave your phone on the front table as you walk into class.

Classroom Conduct: I have three guiding principles in my classroom. 1) Speak up: share your ideas, confusion, and questions. 2) Be respectful: respect your classmates and Dr. Lovell. 3) Think critically: critique ideas, not people.

In-Class Camera Policy: In order to promote community, it is important that faculty are able to interact and engage with students. Thus, during online class activities, students are required to leave their cameras turned on. Students with

extenuating circumstances may request an exemption from this requirement to the professor in writing.

Copyrighted Materials: Copyright in educational materials prepared by the College faculty member is owned by the faculty member, and may not be shared without his or her permission.

Mandatory Reporting: As a faculty member at Manhattan College, I am a mandatory reporter. Please know that, in sharing personal stories or details in class or during office hours, there may be information I am obligated to share with our Title IX officer.

Ethical conduct: Students are expected to adhere to the Manhattan College policy on academic integrity and associated links. All written assignments should be original works composed individually for this course. All academic integrity violations (e.g. plagiarism, cheating, multiple submissions, facilitating dishonesty) will be prosecuted. Be sure that you know what constitutes cheating, fabrication, and plagiarism (See B. Violations of Academic Integrity here: https://inside.manhattan.edu/student-life/dean-of-students/code-conduct.php).

Academic Support: The Center for Academic Success (CAS) is committed to providing student-centered programs and initiatives designed to enhance learning and promote success and persistence for all Manhattan College students. Students will work collaboratively with qualified peers and professionals to develop knowledge, skills and strategies needed for success in the classroom and beyond. The CAS has two locations; the Learning Commons in Thomas Hall 3.10 and the Leo Learning Center in Leo 117/118. Services include online and in-person individual tutoring, online small group peer tutoring (select courses), Supplemental Instruction (select courses), student academic success coaching, and online writing center services. All services are free of charge and available to all Manhattan College students. Appointments are preferred but walk-ins are welcome. To make an appointment, students can log into their Jasper Connect account or visit the CAS in Thomas Hall, 3.10. Students can also contact success@manhattan.edu with any questions. For more information about these services please visit the CAS webpage here, and to learn about CAS Fall 2020 return to campus safety efforts please visit the One Manhattan webpage here. Students can book appointments online by going to the 'MC Quick Links' and clicking the 'Schedule a Tutoring Appointment' tab. Appointments are preferred, but drop-ins are welcome. If you have any questions, please contact the CAS at 718.862.7414, email success@manhattan.edu, or stop by Thomas Hall 3.10. For more information, visit the CAS website.

Manhattan College is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please submit your authorization letter from the Specialized Resource Center (SRC) to me privately during my office hours or by appointment, preferably within the first two weeks of the semester. At that time, I would also like us to discuss ways we can ensure your full participation in the course.

Class Schedule

Unit 1: GIS Basics

Learning Goals:

- Conceptualize a practical geographic question (LO 1)
- Work preliminarily in Excel, Padlet, and Coggle (LO3 & 4)

Readings: EGIS Ch 1, EGIS Ch 3, EGIS Ch 4, Boden blog
Videos: practical questions
Assignments/Labs due: Excel lab, practical question

Aug 31	**Live: course overview, discuss reading, introduce excel lab**
Sep 3	Online: Readings (discussion), Excel lab
Sep 7	*No class*
Sep 10	**Live: GIS projects and analysis, excel lab & practical question due, introduce lab**

Unit 2: Data and Metadata

Learning Goals:

- Conceptualize a philosophical geographic question and refine a practical question (LO 1)
- Find and clean a dataset to use in a research project (LO 2)
- Work preliminarily in ArcMap (LO 3 & 4)

Readings: NOGI Ch 1 Sec 18, Scribbr reading, EGIS Ch 5, Metadata readings,
Videos: setting up your work space
Assignments/Labs due: final philosophical & practical questions, ArcMap lab, tabular data assignment

Sep 14	Online: build a GIS project & roadmap (discussion)
Sep 17	**Live: projects and data, research topics due**
Sep 21	**Live: discuss projects & data**
Sep 24	**Live: GUEST LECTURE LAURIN PARADISE, ArcMap lab due, intro lab**

Unit 3: Projections & Visualizing Data

Learning Goals:

- Finalize a practical and philosophical research question (LO 1)
- Apply different geographic and projected coordinate systems (LO 4)
- Create charts, graphs, and other visualizations using Excel and ArcMap (LO 4)

Readings: Field, Makulec, EGIS Ch 2, EGIS Ch 6, Understanding Projections, Bolstad Ch 3
Videos:
Assignments/Labs due: project proposal & GIS roadmap, projections lab

Sep 28	Online: compare COVID maps (discussion)
Oct 1	**Live: the problem with data, project proposal & roadmap due**
Oct 5	Online: project symbology (discussion)
Oct 8	**Live: discuss mapping, intro lab, projections lab due**

Unit 4: Cartography & Querying

Learning Goals:

- Independently subset or query your own data (LO 3)
- Create a visualization of your subset or query (LO 4)

Readings: Cartography readings, Bolstad Ch 8, SQL Guide, Field Calculator Reading
Videos:
Assignments/Labs due: Subset & query lab, draft workflow

Oct 12	*No Class*
Oct 13 (Tues)	**Live: Midterm review**
Oct 15	Online: Midterm
Oct 19	**Live: Midterm reflection, intro lab, subset & query lab due**
Oct 22	Online: student project (discussion)

Unit 5: Distance & Proximity Analysis

Learning Goals:

- Independently use a distance or proximity analysis on your own data (LO 3)
- Create a visualization of your analysis (LO 4)

Readings Due: Bolstad Ch 9, EGIS Ch 7, EGIS Ch 8
Videos:
Assignments/Labs Due: Final workflow, final project GIS roadmap, distance & proximity lab

Oct 26	**Live: project roadblocks**
Oct 29	Online: reflect on “basic” vs. “advanced” tools
Nov 2	**Live: discuss readings, intro lab, distance & proximity lab due**
Nov 5	Online: revised workflow, critique your peers

Unit 6: Overlay Analysis

Learning Goals:

- Independently execute an overlay analysis (LO 3)
- Create a visualization of your analysis (LO 4)

Readings: NOGI Ch 8, Carroll Blog: 9 steps to great storytelling
Videos: overlay analysis, remote sensing
Assignments/Labs due: Overlay lab, draft Story Map

Nov 9	Online:
Nov 12	**Live: discuss readings**
Nov 16	Online: draft Story Map due
Nov 19	**Live: overlay lab**
Nov 23	Online: Overlay lab due
Nov 26	*No Class*

Unit 7: Presenting GIS Science

Learning Goals:

- Create a Story Map outlining your research questions, analysis, and conclusions (LO 1-3)
- Present your Story Map orally to the class (LO 4)

Readings:
Videos: advanced GIS, GIS careers
Assignments/Labs due: final presentations, final Story Maps

Nov 30	**Live: discussion about telling stories**
Dec 3	Online: critique your peer's Story Maps
Dec 7	**Live: student presentations**
Dec 10	**Live: student presentations, course evaluations**

Readings

Saylor Academy (2012) Essentials of Geographic Information Systems ("EGIS" in this course). https://saylordotorg.github.io/text_essentials-of-geographic-information-systems/index.html

DiBiase, David (2008) The Nature of Geographic Information ("NOGI" in this course). The Pennsylvania State University. https://www.e-education.psu.edu/natureofgeoinfo/node/1672

Monmonier, M. (2018). *How to lie with maps*. University of Chicago Press.

Zeiler, M. (1999). *Modeling our world: the ESRI guide to geodatabase design*. ESRI, Inc.